REMARKS

Claims 1-60 remain in the application. By this amendment, claims 5, 9, 33, and 49 are amended.

Claim Objections

Claims 5, 9, 33, and 49 are objected to because of informalities. By this amendment, claims 5, 9, 33, and 49 are amended. The applicants respectfully submit that the amended claims 5, 9, 33, and 49 are allowable now.

Claim Rejections

1. Claims 1, 2-5, 7, 8, 10, 33-36, 45, and 47 are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart (U.S. Pat. No. 6,107,795) in view of Pelrine et al. (U.S. Pat. No. 5,284,096).

Claim 1 is directed to a distributed traction crawler device, whereby each of a plurality of segments has a wheel assembly, adjacent segments are joined to each other, and at least two of the segments includes a drive couple assembly connecting each wheel assembly to a drive shaft. Rotating the drive shaft of the claimed invention provides *distributed traction force* to the drive wheels of the segments. The drive shaft connected by the wheel assembly to at least two of the segments allows the distributed traction force to drive the crawler device forward or backward.

By contrast, Smart '795 discloses a pipeline vehicle with linked modules, each module providing a specific function apart from other modules. As disclosed, the motor "drives the wheels of the vehicle using gearing and feedback on movement, direction and slippage which can be compensated by internal control" (col. 2, lines 25-27) The Smart vehicle relies on the use of magnetic sensors spaced around the periphery of each module (see col. 2, lines 66-67), to detect the location of the vehicle. As disclosed, and claimed, the Smart vehicle does not suggest the use of distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward.

As stated in the Office Action, Smart does not disclose that each segment includes at least one drive wheel. While Pelrine may disclose a drive assembly connected to the inner wheels of a

flexible vehicle for driving and steering the wheels of a string of connected vehicles, the vehicle relies on the use of inner and outer wheels magnetically connected to allow the wheels roll the vehicle over difficult terrain. There is no teaching or suggestion in Pelrine to use distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward, but instead it focuses on the use of magnetic force to maintain the rolling functionality of the wheels.

Thus, the combination of Smart and Pelrine may suggest a multiple of interlinked segments, each segment having magnetic inner and outer wheels to allow the segmented vehicle to traverse angles, with each segment having a computerized motor driving the individual wheels and a power unit to move the vehicle forward over uneven terrain. However, there is nothing in the combined teachings of these references to make obvious the use of distributed traction force along a drive shaft, which drive shaft is connected to the wheel assembly of each individual segments of the device, as claimed in this application. Thus, applicant respectfully submits that the invention of Claim 1 is patentably distinct over the combination of Smart with Pelrine, and respectfully requests reconsideration and withdrawal of the rejection of this claim under 35 U.S.C. §103(a).

Because claim 1 is patentably distinct over the cited references, applicant respectfully submits that dependent claims 3-5, 7, 8, 10, 33-36, 45, and 47, also are patentably distinct over the cited references, and respectfully requests reconsideration and withdrawal of the rejection of claims 3-5, 7, 8, 10, 33-36, 45, and 47 under 35 U.S.C. §103(a).

2. Claims 1-9, 21, 33-36, 39, 40, 45, and 47 are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart (U.S. Pat. No. 6,107,795) in view of Schempf et al. (U.S. Pat. No. 6,917,176 B2).

As stated above, Smart '795 discloses a pipeline vehicle with linked modules, each module providing a specific function apart from other modules. As disclosed, the motor "drives the wheels of the vehicle using gearing and feedback on movement, direction and slippage which can be compensated by internal control" (col. 2, lines 25-27) The Smart vehicle relies on the use of magnetic sensors spaced around the periphery of each module (see col. 2, lines 66-67), to detect the location of the vehicle. As disclosed, and claimed, the Smart vehicle does not suggest

the use of distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward.

As stated in the Office Action, Smart does not disclose that each segment includes at least one drive wheel. Schempf discloses "a first gear assembly operatively connected to the first steering motor assembly, wherein a portion of the first gear assembly is positioned for rotation about a first axis of rotation." (col. 2, lines 48-51) The drive mechanisms, which each include a separate drive shaft, are integral with each segment of the Schempf vehicle (see, e.g., element 50 of Fig. 3, as described at col. 8, lines 37-52). As described, the locomotion system for the claimed device is "due primarily to its power-efficiency and combined progress travel-speed, combines a powered wheel-driven pre-loadable and adjustable hybrid-locomotor into a single unit" (col. 9, lines 1-7).

The combination of Smart and Schempf may suggest a multi-segmented, motor-controlled device for inspecting pipelines, and which uses a rotatable gear assembly connected to a motor, and potentiometers for feedback to keep the axes of rotation uniform. However, there is nothing in the combined teachings of these references to make obvious the use of distributed traction force along a drive shaft, which drive shaft is connected to the wheel assembly of each individual segments of the device, as claimed in this application. Thus, applicant respectfully submits that the invention of Claim 1 is patentably distinct over Smart in combination with Schempf, and respectfully requests reconsideration and withdrawal of the rejection of this claim under 35 U.S.C. §103(a).

Because claim 1 is patentably distinct over the cited references, applicant respectfully submits that dependent claims 2-9, 21, 33-36, 39, 40, 45, and 47, also are patentably distinct over the combination of Smart and Schempf, and respectfully requests reconsideration and withdrawal of the rejection of claims 1-9, 21, 33-36, 39, 40, 45, and 47 under 35 U.S.C. §103(a).

3. Claims 2, 6, 9, 21, and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and further in view of Schempf et al.

These claims each depend on independent Claim1, which is not rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and further in view of

Schempf et al. Thus, applicant respectfully submits that because the independent claim is patentably distinct over the cited references, the cited dependent claims remain patentably distinct over the cited claims. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claims 2, 6, 9, 21, and 40 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and further in view of Schempf et al.

4. Claims 11-20, 22-32, 42-44, 46, and 48, are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and further in view of Grant et al. (U.S. Pat. No. 6,450,104 B1).

These claims each depend on independent Claim1, which is not rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and further in view of Grant et al. Thus, applicant respectfully submits that because the independent claim is patentably distinct over the cited references, the cited dependent claims remain patentably distinct over the cited claims. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claims 11-20, 22-32, 42-44, 46, and 48 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and further in view of Grant et al.

5. Claims 11-20, 22-32, 41-44, 46, and 48, are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Schempf et al., and further in view of Grant et al. (U.S. Pat. No. 6,450,104 B1).

These claims each depend on independent Claim1, which is not rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Schempf et al., and further in view of Grant et al. Thus, applicant respectfully submits that because the independent claim is patentably distinct over the cited references, the cited dependent claims remain patentably distinct over the cited claims. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claims 11-20, 22-32, 42-44, 46, and 48 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Schempf et al., and further in view of Grant et al.

6. Claim 41 is rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine, and further in view of Schempf et al. and Grant et al.

This claim is dependent on independent Claim1, which is not rejected under 35 U.S.C.

§103(a) as being unpatentable over Smart in view of Pelrine, and further in view of Schempf et al. and Grant et al. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claim 41 under 35 U.S.C. §103(a) as being unpatentable over Smart and further in view of Schempf et al. and Grant et al.

7. Claims 49-56 are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Schempf et al., Pelrine et al., and Grant et al.

With respect to claim 49, Smart '795 discloses a pipeline vehicle with linked modules, each module providing a specific function apart from other modules. As disclosed, the motor "drives the wheels of the vehicle using gearing and feedback on movement, direction and slippage which can be compensated by internal control" (col. 2, lines 25-27) The Smart vehicle relies on the use of magnetic sensors spaced around the periphery of each module (see col. 2, lines 66-67), to detect the location of the vehicle. As disclosed, and claimed, the Smart vehicle does not suggest the use of distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward.

Schempf discloses "a first gear assembly operatively connected to the first steering motor assembly, wherein a portion of the first gear assembly is positioned for rotation about a first axis of rotation." (col. 2, lines 48-51) The drive mechanisms, which each include a separate drive shaft, are integral with each segment of the Schempf vehicle (see, e.g., element 50 of Fig. 3, as described at col. 8, lines 37-52). As described, the locomotion system for the claimed device is "due primarily to its power-efficiency and combined progress travel-speed, combines a powered wheel-driven pre-loadable and adjustable hybrid-locomotor into a single unit" (col. 9, lines 1-7). There is no teaching or suggestion Schempf to use distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward, but instead uses an elaborate motor mechanism to do the same.

While Pelrine may disclose a drive assembly connected to the inner wheels of a flexible vehicle for driving and steering the wheels of a string of connected vehicles, the vehicle relies on the use of inner and outer wheels magnetically connected to allow the wheels roll the vehicle over difficult terrain. There is no teaching or suggestion in Pelrine to use distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or

backward, but instead it focuses on the use of magnetic force to maintain the rolling functionality of the wheels.

Finally, Grant discloses a robotic apparatus for moving inside a pipe, but similar to the other cited references, relies on a linear actuator, such as a pneumatic cylinder, hydraulic actuator, electromagnetic actuator, or other energy device connected to the different segments to move the robot. It discloses that "front segment 20 provides a front mechanical linkage or interface between front linear actuator 45 and front legs 60" (col. 9, lines 41-43) There is no teaching or suggestion in Grant to use distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward, but instead it focuses on the use of a linear actuator to propel the device.

The combination of Smart, Schempf, Pelrine, and Grant may teach an articulated vehicle with a magnetic wheel assembly and a linear actuator between each segment, controlled by a computer, whereby each segment is a separate functioning module. However, the combination does not teach or suggest applicant's claimed crawler device that uses distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claim 49 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Schempf et al., Pelrine et al., and Grant et al.

Claims 50-56 each depend on independent Claim 49. Thus, in light of the above, applicant respectfully submits that because the independent claim is patentably distinct over the cited references, the cited dependent claims are patentably distinct over the cited claims. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claims 50 - 56 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Schempf et al., Pelrine et al., and Grant et al.

8. Claims 57-60 are rejected under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al. and Grant et al.

Regarding the rejection of independent claims 57 and 59, Smart '795 discloses a pipeline vehicle with linked modules, each module providing a specific function apart from other

modules. As disclosed, the motor "drives the wheels of the vehicle using gearing and feedback on movement, direction and slippage which can be compensated by internal control" (col. 2, lines 25-27) The Smart vehicle relies on the use of magnetic sensors spaced around the periphery of each module (see col. 2, lines 66-67), to detect the location of the vehicle. As disclosed, and claimed, the Smart vehicle does not suggest the use of distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward.

While Pelrine may disclose a drive assembly connected to the inner wheels of a flexible vehicle for driving and steering the wheels of a string of connected vehicles, the vehicle relies on the use of inner and outer wheels magnetically connected to allow the wheels roll the vehicle over difficult terrain. There is no teaching or suggestion in Pelrine to use distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward, but instead it focuses on the use of magnetic force to maintain the rolling functionality of the wheels.

Finally, Grant discloses a robotic apparatus for moving inside a pipe, but similar to the other cited references, relies on a linear actuator, such as a pneumatic cylinder, hydraulic actuator, electromagnetic actuator, or other energy device connected to the different segments to move the robot. It discloses that "front segment 20 provides a front mechanical linkage or interface between front linear actuator 45 and front legs 60" (col. 9, lines 41-43) There is no teaching or suggestion in Grant to use distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward, but instead it focuses on the use of a linear actuator to propel the device.

The combination of Smart, Pelrine, and Grant may teach an articulated vehicle with a magnetic wheel assembly and a linear actuator between each segment, whereby each segment is a separate functioning module. However, the combination does not teach or suggest applicant's claimed crawler device that uses distributed traction force along a drive shaft to the drive wheels of each segment to drive the vehicle forward or backward. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claims 57 and 59 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and Grant et al.

Claims 58 and 60 each depend on independent Claims 57 and 59, respectively. Thus, in

light of the above, applicant respectfully submits that because the independent claim is patentably distinct over the cited references, the cited dependent claims are patentably distinct over the cited claims. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claims 57 - 60 under 35 U.S.C. §103(a) as being unpatentable over Smart in view of Pelrine et al., and Grant et al.

CONCLUSION

Applicant, accordingly, respectfully submits that in view of the preceding amendments and remarks, claims 1- 60 are allowable over the cited references, whether considered alone or in combination, and respectfully requests reconsideration and withdrawal of the rejections of these claims under 35 U.S.C. §103(a). If a telephone conference will expedite prosecution of the application the Examiner is invited to telephone the undersigned counsel.

No additional costs are believed to be due in connection with the filing of this paper. However, the Commissioner is hereby authorized to charge any additional fees, or credit any overpayment, to our Deposit Account No. 50-1133.

Respectfully submitted,

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